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Electronic Business®

FOR MANAGEMENT IN ELECTRONICS, COMPUTER & SYSTEMS COMPANIES — WORLDWIDE

JULY 10, 1989

WINDOW OF OPPORTUNITY

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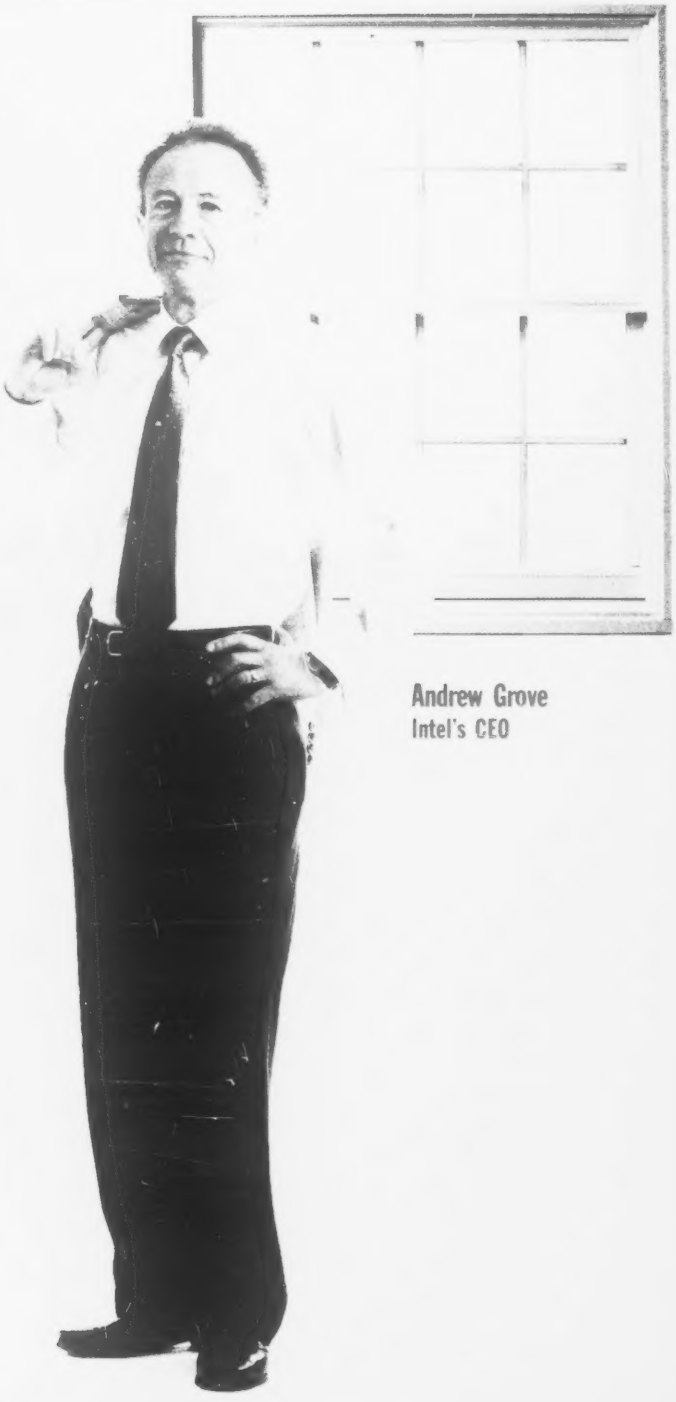
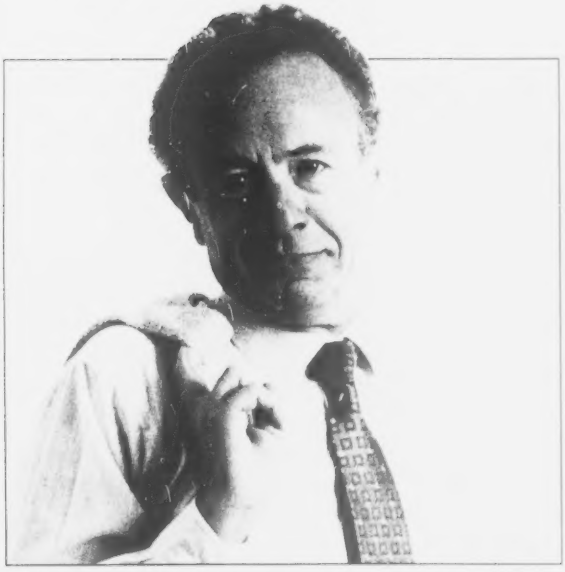


Andrew Grove
Intel's CEO

Electronic Business

FOR MANAGEMENT IN ELECTRONICS, COMPUTER AND SYSTEMS COMPANIES—WORLDWIDE

VOL. 15, NO. 14 JULY 10, 1989



PAGE 28 Intel's Andrew Grove: "The 860 has a substantial possibility of confusing customers"

COVER STORY/STRATEGIES

28 The microprocessor marketing wars

An extraordinary "window of opportunity," guided by the clamor for RISC, has summoned U.S. microprocessor manufacturers to the marketing front — locking them in a struggle for the hearts and minds of key systems developers. At stake is a once-in-a-decade chance to establish a processor as a standard in the $100 billion office computing market. When the dust settles in this marketing war, the cost, forecast by one marketing guru, will top $50 million.

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Around in one form or another for some 20 years, object oriented programming, promising productivity gains and cost savings, is suddenly catching fire among computer hardware and software vendors.

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23 Digital scopes overtake long-favored analog

This year, for the first time, the digital storage oscilloscope market is expected to outperform analog oscilloscopes by 9%. And by 1992 that margin is forecast at 50%. Despite that growth, DSOs have yet to win full acceptance.

COVER STORY/STRATEGIES

28 The microprocessor marketing wars

In 1988, $15 million worth of RISC central processors were sold. Analysts are predicting that in the next five years the processors will consume up to 41% of the office market, making RISC anywhere from a $215 million to $1.3 billion market. There is no doubt that RISC is becoming the choice for a new generation. The marketing war to establish a RISC processor as a standard shapes up between giants Intel and Motorola, both once viewing RISC as faddish; and the more nimble Sun and Mips Computer Systems.

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The foreign exchange markets have turned less predictable than at any time in the past dozen years, but high tech's corporate treasurers have refused to be intimidated. They are using innovative techniques in the fickle foreign currency markets to protect profits — and even make some cash on the side.

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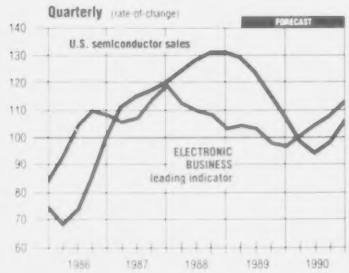

PAGE 76 Business Barometer: Sales and profits indexes

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60 It's telecom all the way for a rejuvenated Ericsson

Sweden's leading electronics firm once was a vocal supporter of the idea of converging computers and telecommunications. But now LM Ericsson has abandoned that doomed strategy to remain true to its roots: telecom. It is making greater inroads into the United States and has realized strong profits after four disappointing years.

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Change at the top

Being section editor of ELECTRONIC BUSINESS, unlike what the title might indicate, allows me to do a little of this and a little of that. My job mostly has me scouring through mounds of manuscripts to ensure that the articles appearing in our magazine are clearly defined, tightly edited and, most of all, have value to our busy readers.

The little bit of this this time around has me announcing a change in the editorial leadership and direction of ELECTRONIC BUSINESS.

Jeff Bairstow, previously executive editor, is now sitting in the hot seat. That's my term for editor. Jeff has under his wing some impressive, experience-laden credentials in the three areas that concern us the most: journalism, business and technology. He has a bachelor's degree in electrical engineering and an MBA; he began his journalism career 20 years ago with *Electronic Design* and worked several years as a senior editor of *High Technology*. Before joining us in March as executive editor, Jeff was on the start-up team of *PC/Computing*.

Jeff takes over for John Kerr, who moves to editor-at-large with responsibility for reporting and writing special projects. The change at the top signals a refocus for us in our quest to continue to make ELECTRONIC BUSINESS the book of choice for management in electronics, computers and systems companies worldwide. As summer turns to fall, you'll read more comprehensive stories from Europe and Asia as we extend our coverage from London and Tokyo; you'll see beefed up financial and economic coverage and analysis as we add two additional editors to that department; and we're returning a full-time editor to Washington to track the goings-on of the world's most influential government. Stay tuned . . .

Jeff Bairstow

Welcome, Jeff, to the hot seat.

The microprocessor marketing wars

The 32-bit microprocessor business, says associate editor Michael Leibowitz, is the most prestigious, and perhaps most strategically important, semiconductor market in the world. It is an industry, Leibowitz notes, that is dominated by "crusty old engineers" who have had a disdain for marketing. But no more, as the clamor for RISC processing is opening a "window of opportunity" for chip companies such as Motorola and Intel. Our cover story illustrates how and why this costly battle is being waged on the marketing front.

MARVIN GREENE, section editor

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VBPA ABP

Digital scopes overtake long-favored analog

DSOs are expected to outdo analog scopes by 9% this year and 50% by 1992. Still, pricing and acceptance are major issues

This year, for the first time, the digital storage oscilloscope market will outperform analog oscilloscopes by 9%, according to market estimates. Worldwide sales of DSOs are expected to grow to $620 million, 16% more than 1988 sales.

As recently as five years ago, the DSO market did not exist. If an engineer had a scope on his workbench it was analog. Increased sales of DSOs have caused a four-year erosion of the analog market. By 1992, says Galen Wampler, president of San Jose-based market research firm Prime Data Inc., the DSO market, having grown 18% since last year, will top the $1 billion mark and be twice the size of the analog market. "Combined, the scope market is still growing but analog is declining," Wampler says.

Despite the fast growth, the scope industry nonetheless faces a struggle to win market acceptance for DSOs while combating consistent downward pricing pressures. Vendors are trying to ease the transition by making digital scopes that look and feel like analog scopes and by offering scopes that have both analog and digital features.

Because of the heavy R&D requirement, the DSO market is commanded by major players. The traditional heavy hitters — industry leader Tektronix Inc. of Beaverton, Ore., and second place Hewlett-Packard Co. of Palo Alto, Calif. — control 60% of the market between them. Netherlands-based N.V. Philips GL and Gould Inc. of Rolling Meadows, Ill., follow the two leaders with a combined share of about 20%, according to Wampler.

The battle for control of the DSO market started in 1984 when HP announced its first digital scope and discontinued its line of analog scopes. HP rapidly rose to a prominent position in the market at the expense of old rival Tektronix, which had previously dominated the analog market. Although today it is not among the top players, Nicolet Instrument Corp. invented digital scope technology.

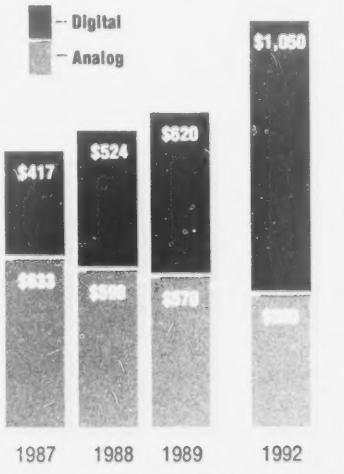
Downward pricing pressures

Consistent downward pricing pressures and an uneducated customer confront both HP and Tektronix as they vie for dominance in the DSO market. Like creatures of habit, engineers are used to an analog scope. "People believe their analog scopes. They trust them," says Fred Rampey, Hewlett-Packard's R&D manager for digital scopes and logic analyzers in Colorado Springs. "Digital scopes have not reached that level of confidence but the barriers are falling."

All the major players have seen the need to inform the customer about the advantages of digital. As part of marketing efforts to enlighten the customer base, both Tektronix and John Fluke Manufacturing Company Inc. of Everett, Wash., have produced video tapes and sponsored seminars and focus groups to help customers understand DSOs.

Oscilloscope market

Worldwide market ($ millions)



Source: Prime Data Inc.

Analog-like digital scopes have eased the transition. "Scopes that have both analog and digital are helping customers," says Thomas Johnson, associate marketing manager of Philips test and measurement group at Fluke. Johnson says this is a transitional product that will last about five years. Vendors are also trying to speed market acceptance by making digital scopes that look like analog scopes where ever possible.

The other major challenge for vendors in the DSO market is the continuing downward pressure on prices. HP's first repetitive DSO had two channels at one gigahertz for a price of $18,000. Today's equivalent has four channels at 500 megahertz for $4,900. HP's Rampey says, "That's about a 4-to-1 improvement." A good rule of thumb is that the price/performance ratio will increase by a factor of two every two-to-three years, he says. This upward pressure on the price/performance ratio has all the industry players scrambling to keep pace with customer demands.

These intense pricing pressures are making manufacturing a key area of concern. Tektronix has concentrated on honing just-in-time techniques at its medium- to low-end scope division. Another way it meets these pressures is through a wide product offering. "We want to have a broad portfolio to address the price point the customer is going to pay," says Ronald Fowler, marketing manager of Tektronix's laboratory instruments division. The decreasing cost of the low to midrange scopes under $10,000 is also accelerating market penetration.

The lowered cost is causing the shipments to grow faster than sales for scopes below the $10,000 mark. The high-end DSOs, where performance is more of an issue, are less sensitive to these pressures. Unit volume and sales volume are "closer to parity" at the high end, says Fowler.

The digital storage oscilloscope market is poised to continue as the domain of the large players. They own the technological high ground and will continue to invest heavily in R&D to keep pace with market demands. "Now it is a marketing game to provide the particular price performance for the niche," says Prime Data's Wampler.

TONY GREENE

It's telecom all the way for a rejuvenated Ericsson

Sweden's leading electronics firm, its eye fixed on the U.S., is realizing strong profits after forsaking computers to stay true to its telecom roots

BY ELAINE WILLIAMS

"Ericsson has the prerequisites to remain a strong and independent international telecommunications company," Bjorn Svedberg, CEO and president of Sweden's leading electronics group, declares unequivocally. Svedberg's enthusiastic assessment is certainly reflected in LM Ericsson's latest fiscal year financial figures that show the company returned to strong profits in 1988 after four years of disappointing results.

Ericsson raised its pre-tax profits for fiscal 1988, ended Dec. 31, to $299 million — a dramatic 66% increase over the previous year's figure of $180 million. This increase was achieved despite a 3.5% decline in 1988 sales of $5.4 billion. At first glance, the reduction looks disappointing, but in 1988 Ericsson sold two of the three units of its information systems division, which had accounted for more than 18% of its total sales the previous year.

The unloading of Ericsson Information Systems — a major drain on Ericsson's resources that prevented the group from living up to ambitions to become a computer systems leader — signals the company's seriousness about remaining true to its roots — telecommunications. As recently as a few years ago, Ericsson had been a vocal supporter of the idea of convergence of computers and telecommunications in building office systems. It eventually realized that such a strategy was damned, hence the reshaped focus on telecommunications.

"It is highly gratifying to note that concentrating our strength in our main business areas is yielding a stable increase in earnings and profitability," Svedberg says. "We will focus on the business we have now."

First quarter 1989 figures released in May confirm the CEO's feeling. Worldwide order bookings increased 34% over the same period in 1988.

Analyst Hakan Filipson, who follows Scandinavian electronics companies for Baring Securities Ltd., London, says Ericsson's venture into computers was akin to "throwing good money after bad. It is very clear from the company now that they are focused." Restructuring and divestment, as in the case of selling the majority of the data systems division, and partnering lie at the heart of Ericsson's strategy.

Headquartered in Stockholm, Ericsson's core involves seven business areas that are dominated by three main sectors — public telecommunications, which represented 43.7% of business in 1988; radio communications, 15.2%; and business communications, 11.3% — all underpinned by strategic areas such as components.

Bjorn Svedberg, LM Ericsson president and CEO: "We will focus on the business we have now"

About 70% of the 113-year-old company's revenue, including almost 20% from Sweden, is derived from Europe, where its public telecommunications business is strong. In North America, the opposite is true. Ericsson is one of several secondary players, behind leaders United States-based AT&T and Northern Telecom Ltd. of Canada, in the mature telephone switching sector. However, Ericsson plays big in radio communications in North America, claiming a 24% share of the continent's high-growth celluar telephone systems market.

After reaching a peak of nearly 80,000 employees worldwide at the end of 1985, Ericsson's personnel numbers fell to about 65,000 at the end of last year. "Restructuring measures will be the rule and not the exception," asserts Svedberg.

Cost cutting also includes moving its telephone manufacturing activities away from Sweden to the Far East over the next two years. Says Svedberg: "It is not possible to achieve profitable production of telephone instruments in Sweden." At the end of last year about half of the firm's workers were based in Sweden, where labor typically is costly, and some companies there, including Ericsson, have been hit by strikes.

In its public telecom business, Ericsson vice president John Meurling says that next year the company will buy computer hardware to provide the maintenance and support it needs for its management systems that are linked to its AXE telephone exchanges. AXE, the company's digi-

tal electronic exchange technology, forms the basis for Ericsson's telecommunications products. Previously, the company had its own proprietary hardware to do the job, but it is no longer a core activity.

Ericsson is still divesting other parts of the company that do not fit into its overall telecommunications strategy. Recently, it sold off its signaling division that provides electronic equipment for rail and road signaling equipment.

Part of its components division, with 2.3% of total sales in 1988, also has been sold off, as Ericsson intends only to manufacture those components that are of strategic importance and that add value to its products. So this spring, Ericsson let go its RIFA capacitor business along with the name; capacitors represented some 20% of the components division sales. With no strategic importance, Ericsson saw that capacitors would take a considerable investment to keep up with the most recent technological advances.

Instead, the components business will concentrate on its ASIC technology, thick- and thin-film hybrid expertise and power supplies, where it can see a growing market. Ericsson Components sells 70% of its output to the Ericsson group, although this part of the group has a three-tiered strategy that includes selling to other telecommunications companies and to the industrial market. The components division feels that volume manufacturing is vital for its profitability, and, because some 16% of sales goes back into R&D, it must make efficient use of its developments. It has an R&D operation in the heart of Silicon Valley in order to be close to ASIC developments.

Seeking partners

Partnerships, like restructuring, are key to Ericsson's strategy. But the company insists it won't partner its core products, such as the AXE switch system. "We are looking for partners to share development," says Meurling.

Ericsson raised its 1988 pre-tax profits 66% over the previous year

Ericsson currently is seeking suitable allies to develop lower cost optical lasers, Meurling adds, and in another field has signed an agreement with Texas Instruments Inc. TI will offer the manufacturing technology for ASICs and Ericsson will design the circuits for the chipsets. Analyst Filipson says the TI-Ericsson deal could be advantageous for both companies because "they are not in a competitive position with each other."

Svedberg says a further example of Ericsson's technology-based partnering is an agreement between Ericsson and Matra SA in France for joint development of products for the Pan-European cellular phone system, which is to cover 18 countries by 1991. The object of any agreement should be either to share costs or to get a better access to markets, he explains.

However, Svedberg does rule out any possibility of merging with another company despite the industry's trend toward mergers, such as the Italtel SpA and AT&T agreement and the ongoing rumpus between Siemens AG, Britain's General Electric Co. and The Plessey Company Plc. Asserts Svedberg: "We are one of the top players from a volume point of view. We don't need a big bang merger."

Svedberg points to the increased opportunities in many telecommunications markets, with many traditional public telecom firms now facing open competition with new private companies for the first time. This deregulation and divestiture began in the United States and is being repeated throughout the world.

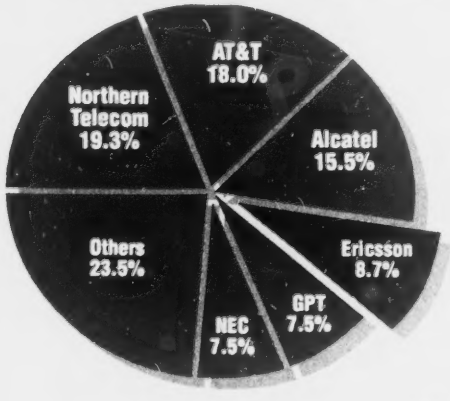
The installed base worldwide of some half-billion local telephone lines, including an estimated 127 million in the United States, will eventually be replaced by digital technology. In 1988 the digital switch replacement market totaled 31 million lines, according to market researcher Northern Business Information Inc., and Ericsson claimed an 8.7% share of that, although located well outside the United States.

Ericsson's objective in the U.S. is to become the third player in the market behind AT&T and Northern Telecom. "That is our goal," says M. Peter Thomas, president and CEO of Ericsson Inc., the company's Richardson, Texas-based U.S. subsidiary. But Ericsson's move into the U.S. switch market — dominated by AT&T's and Northern Telecom's combined 90% share — has been slower than anticipated, and "there has not been the replacement that everybody expected," says Steve Kropper, senior consultant for International Data Corp., Framingham, Mass.

Third-player competition also is coming from West Germany's Siemens AG and Japan's NEC Corp.,

Worldwide public telecommunications market

Share of total local digital lines placed in service in 1988



Total local digital lines placed in service in 1988:
31 million

Value of total market in 1988:
$15 billion

Source: Northern Business Information Inc.

among others. "[Ericsson is] finding it tougher in the United States than expected," according to Suzanne Brennan, product manager, world telecom markets, Northern Business Information Inc., New York City. "The question is, will the regional holding companies give these third suppliers sufficient business to be in the market?" Thomas concedes that the "market isn't growing very fast." The regional holding companies "aren't desperate to add anybody," he says.

Brennan points to 1993 — the target year for replacing much of the current analog switching equipment — as a break point for Ericsson if it is to realize ambitions to be the third player in the U.S. market. "They must show they have the technology and applications." Thomas, while deemphasizing 1993 as a make-or-break year, acknowledges, "The change out of those switches is an important event."

For its part, Ericsson believes its AXE switching technology gives it an advantage. Svedberg calls the AXE a "flexible product for tomorrow. Many parts of the specification have not been written so that we can incorporate new features." Thomas, likening the switch's technology to a real-time computer system, notes that the AXE's architecture is defined by its software and not its hardware.

Business communications, like public telecom, is a cutthroat business. "No one is making any money in it," says Ronny Lejdemalm, president of Ericsson Business Communications, but Ericsson is determined to be a world player. The business communications division of Ericsson Inc. recently won a $29.5 million contract to supply what is going to be the largest private PBX system in the world to the University of Massachusetts. Ericsson is supplying its high-capacity MD110 technology — based on AXE principles — to connect 400 buildings and more than 30,000 lines in a single system. The company sees the order as a breakthrough in the U.S. market.

Ericsson applies its heralded AXE technology beyond the public telecom and business communications sectors and into its third major activity, radio communications. AXE, for example, forms the core switching element in its cellular phone equipment. In the cellular systems market,

M. Peter Thomas, president and CEO of Ericsson's U.S. subsidiary: Our goal is to become the third player in the U.S. telephone switch market

in addition to its 24% stake in North America, Ericsson claims a 40% world share.

Mobile telephones certainly breathed new life into what is a very mature and staid sector of the telecommunications industry. Last year, the number of cellular subscribers increased by about 44% worldwide, and a similar growth is expected for this year. It is sometimes easy to forget that the first cellular mobile telephone service was only launched in 1981. Now there are more than 4 million subscribers worldwide, and networks are in service or planned in nearly 50 countries around the world.

Restructuring and partnering lie at the heart of Ericsson's strategy

Ericsson's positioning in cellular balances its risk in the United States, according to analyst Brennan of Northern Business Information. "Certainly their strength in cellular can't hurt them in the United States. It can only help them."

Meanwhile, as Europe has now agreed on new standards for mobile telephone systems, Ericsson, with its pioneering work in the Scandinavian market, is well placed to supply systems to the European market. In France, Ericsson is working closely with Matra, and it has worked with Siemens in the West German market. And Orbitel Ltd., which is co-owned by Racal Electronics in Britain, operates one of the British cellular networks and has agreed to buy the Ericsson equipment.

Ericsson believes that the next major development will be the creation of public mobile networks that are designed for data rather than voice communications, and to this end the company has been promoting the Mobitex system standard. In May, Ericsson signed a $55 million agreement with a subsidiary of RAM Broadcasting Corp. for equipment that will be used in the intial phase of the first Mobitex system in the United States.

Mobitex is already in service in Sweden and is being installed in Canada, and because of the strong interest from other countries Mobitex is being offered as an "open" standard for public mobile data networks. Full technical data on the open air radio interface is being published by Ericsson so that any other manufacturer can supply terminals equipment while the Swedish company retains the central switch technology. This then plays to Ericsson's strengths. As vice president Meurling puts it, "Ericsson is good at switching, but it has not been as good at handling peripherals."

"After the divestiture we went through a major corporate hiccup. But Ericsson has now gone back to its main business — telecoms," says Meurling. "[Office automation] has not been a great success for anyone in telecommunications." Meurling cites the renegotiated AT&T deal with Ing. C. Olivetti & Co. and the difficulty between Rolm and IBM.

Ericsson's global focus is in keeping with a company that has always been forced to export. Only a small percentage of its total business comes from Sweden, even though the company represents around 70% of the total electronics output in its homeland. "Competition is our world," says Meurling. "We've never really had the protection of a large home market. The question is: Can we afford to keep up the pressure?" □

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Promises for MAP remain, but where are the buyers?

Optimistic 1989 sales projections have been lowered, despite the unveiling of MAP 3.0 products. Price and software issues lead to a "wait and see" attitude

BY SYLVIA TIERSTEN

Build a better mousetrap — and they'll beat a path to your door, the cliche goes. Well, maybe — but not if that mousetrap is technology that is new, unproven and costly, and not if the installed base of conventional traps is extensive. Manufacturing Automation Protocol presents such a case.

MAP, a nonproprietary computer networking protocol for factory floor automation, is intended to establish a standard means of communication between computers and production cell equipment in a multivendor environment. A standardized network, MAP proponents argue, can reduce costs associated with training, installation, maintenance, spare parts inventory, updating, wiring, custom hardware and software.

General Motors Corp. created MAP in the early 1980s. GM offered a feasibility demonstration at the 1984 National Computer Conference and followed up a year later with 2.1 and 2.2 MAP specifications to enlist vendor support. It anticipated a flood of MAP products by 1986 that never came.

Fearing that 2.X standards were emerging standards with a short shelf life, many potential vendors and users decided to wait it out. And many of them are still dragging their feet more than a year later — despite the unveiling of MAP 3.0 prototypes at last year's Enterprise Networking Event in Baltimore and the freezing of 3.0 standards for upward capability through 1994. Proprietary Ethernet still outsells nonproprietary MAP by about 5 to 1.

In the short term, the bears remain bearish on MAP, and even some of the bulls have revised their projections downward. Market research firm Dataquest Inc., which originally predicted $115 million worth of MAP sales to the North American market in 1989, is now anticipating $59 million.

"The ENE show didn't have the galvanizing effect everyone thought it would," says Robert George, a senior industry analyst at Dataquest. "People seem to be standing back and saying, 'I'll let other companies make the mistakes, while I wait till there's more support available — and more applications software.' "

Dataquest now is estimating a 12% increase in 1989 sales of MAP and Open Systems Interconnection (OSI) products to North America over last year's $54 million, and a 13% compound annual growth rate from 1990 to 1993. OSI, of which MAP is a subset, is a series of communications standards developed by the International Standards Organization for the interconnection of communication-oriented computer equipment with varying protocols.

Price, utility issues

Price and utility remain critical issues in assessing MAP's ultimate success in the marketplace. While process control and automotive manufacturers value MAP's ability to run on 802.4, noncollision token bus media, other users may be more inclined to settle for proven, less-costly proprietary solutions. As for Ethernet, any rumors of its impending death have been greatly exaggerated. "Ethernet is very well entrenched and remains a good solution for large file transfer on an irregular basis," notes George. North American sales of the product last year reached $259 million, according to Dataquest, which is pro-

MAP sales: Growing but not taking off

Sales include hardware and software ($ millions)

Source: Dataquest Inc.

jecting average annual growth of 15% through 1993.

Over the next 10 years, the fortunes — and price profile — of MAP will be tied into computer integrated manufacturing implementation, says George. He anticipates a 25% annual price cut in MAP products over the next five years. Assuming that a reasonable volume develops for MAP products, prices for Ethernet and MAP should be roughly comparable by 1993.

The new MAP 3.0 products, unlike their 2.X predecessors, offer some degree of functionality at all seven protocol layers. These are, in ascending order: physical; data link; network; transport; session; presentation; and application. The presentation layer, which earlier MAP products did not have, provides translations between standardized data formats. MAP 2.X also lacked network management capability and directory services in the application layer.

Few exhibitors were actually ready to deliver alpha and beta-tested MAP 3.0 by the conclusion of the ENE show. But by the end of this year, "every vendor of any importance will have a 3.0 connection — and that's what the show accomplished," says Tony Helies, president of Concord Communications Inc., a Marlboro, Mass., maker of MAP/TOP (Technical and Office Protocol) products. Even Digital Equipment Corp., a staunch defender of Ethernet, has MAP 3.0 products in the offing. Concord shipped its first 3.0 products last August. Helies claims MAP sales for the first quarter of 1989 are 70% higher than last year.

The lull since the ENE show actually has been "a quiet period of vendor engineering and testing," notes Paul Accampo, business development manager for Hewlett-Packard Co.'s information networks group. Those who expected a blizzard of MAP implementations in 1989 may have underestimated sales cycle time for a shop floor control project. HP, he says, is currently talking with "over 20 customers" about specific 3.0 MAP network installations.

Although 1988 was not "the year of MAP in terms of product," it was "the year of MAP in terms of technical specification milestones," says Michael Kaminski, manager of communications/MAP of the advanced engineering staff of GM. The star of the ENE show was an OSI network for the custom manufacture of products in a multivendor, computer-integrated environment. The Society of Manufacturing Engineers, which operated the 1988 show, is planning a reprise for 1991.

Potential of GOSIP

Another development that could augur well for MAP in the long run is the adoption of the GOSIP (Government Open Systems Interconnection Profile) program by the U.S. government. Since GOSIP will become mandatory for federal government agencies on Aug. 15, 1990, virtually every major procurement RFP will require bidders to offer an OSI stack. A stack is a set of OSI protocols with defined options starting at Layer 1 and going through Layer N, with N no greater than seven.

Over the next 10 years, the fortunes — and price profile — of MAP will be tied into CIM implementation

"OSI will make it — no matter what. The question is when," muses Robert Franklin, product marketing manager, communications, for Motorola Inc.'s microcomputer division. The answer, he thinks, is more than a little price dependent, particularly when it comes to MAP 3.0 and factory floor implementation. "We came away from the ENE show with a really good feeling — but it didn't result in a lot of sales," says Franklin. "It's still hard to justify a $4,000-per-node as opposed to a $1,000-per-node cost to someone who wants to build a factory with 5,000 connections."

Most MAP systems are currently priced at over $2,000 for modem, software and two controller boards. Franklin supposes that a single-board system with built-in modem and software that sold for under $1,000 would make MAP more competitive against Ethernet. But prices will not sink to this level until a major user — read GM — buys huge quantities of MAP 3.0. Ethernet currently bears a $1,000 to $2,000 cost-per-node, compared to $3,000 to $4,000 for MAP.

Production of a $1,000, single-board, single-slot system would require miniaturization of a broadband modem. If this technical feat is market-driven, "you're looking at one year," Franklin estimates. If the user demand is not there, "you're probably looking at four or five years" to produce a one and one-half inch square modem at a cost of under $100, he says.

GM's Kaminski sees the price issue in a different light. In choosing between 802.4 media and Ethernet, "you're being penny wise and pound foolish if all you look at is connection cost," he says. "You have to look for the most cost-effective solution — and that's not necessarily the cheapest product."

Within the next 12 to 18 months, Kaminski says, GM will probably install eight or nine plants with MAP 3.0 networks. But product mixes change, timing environments change, and betting the farm on GM automation plans has cost robotics and automation vendors dearly in the past.

Fluctuating standards and a narrow marketplace, meanwhile, deterred robot makers from investing heavily in high-performance 2.X MAP interfaces. These companies "needed to feel that their investment would be recoverable within three to five years of sales," explains Henrik Schutz, industrial computer product manager at GE Fanuc Automation North America Inc., Charlottesville, Va. Now that 3.0 specifications are firmly in place, Fanuc Ltd. of Japan, which has a 50% ownership stake in GE Fanuc, is building robots with MAP interfaces.

GE Fanuc, which provided 2.X MAP interfaces for its programmable controllers and computer numerically controlled (CNC) machine tools, is currently developing 3.0 product. So is Allen-Bradley Co., which also caters heavily to the factory automation market. But major computer vendors, with less of a stake in the manufacturing world, "do not view MAP as an important opportunity to the extent that we do," according to Schutz. If IBM and DEC are relatively unenthusiastic about MAP, that's understandable, he concedes, but it is also "a problem, since the purpose of MAP is to tie

computers to automation controllers."

Boeing, a longtime champion of MAP/TOP, recently circulated two RFPs for new production facilities. In one instance, the end user opted for an OSI solution and is developing MAP 3.0 prototypes and applications. In the second case, the user chose a proprietary network with a commitment to an OSI migration path, because the time frame was short and "the end user was not comfortable that he was at a solid product level for OSI," according to Laurie Bride, manager of network architecture for Boeing Computer Services in Seattle.

Manufacturing Messaging System (MMS) protocol, an applications protocol for machine-to-machine communications that works well with robots, and 802.4 interfaces were unavailable in a 3.0 format. "Faced with a short leadtime to bring a facility on line, you don't really want the first release of the product, but something that's a little more stable," says McBride, "and many users are running into that situation."

Furthermore, not every end user wants to be a pioneer or early adopter of technology. "If our major suppliers of distributed control systems, programmable controllers and computer equipment had MAP products, we would probably be using them right now," says Everette Eldridge Sr., an electrical engineer in control systems engineering at Tennessee Eastman Co., a chemical manufacturing arm of Eastman Kodak Co. However, Eldridge's enthusiasm for MAP implementation is tempered by "the development work that needs to be done as far as application interfaces. We wouldn't just jump in and buy product if there's no software to run through that product."

MAP 3.0 product is still unavailable for network management and directory services. And there is a dearth of MMS product at the machine control level, notes Bruce Gengler, network consultant at Deere Technical Services in Moline, Ill. Deere is beta testing MAP 3.0 in a pilot project that involves downloading CNC information to laser-based cutting machines.

Applications software is an endemic problem in manufacturing — and MAP implementation could go a long way toward solving it, reasons Andrew McMillan, executive vice president of Industrial Technology Institute, a not-for-profit R&D corporation in Ann Arbor, Mich. "There are not a whole lot of Lotuses out there for manufacturing right now, because you don't have a common environment," he says.

The World Federation of MAP/TOP User Groups is developing an international conformance testing program for MAP and TOP profiles, and ITI is the contractor for organizing this effort. The goals are to harmonize tester and user industries worldwide and develop accreditation for test centers. Federation procedures should be in place by July, says McMillan, who heads its North American delegation. □

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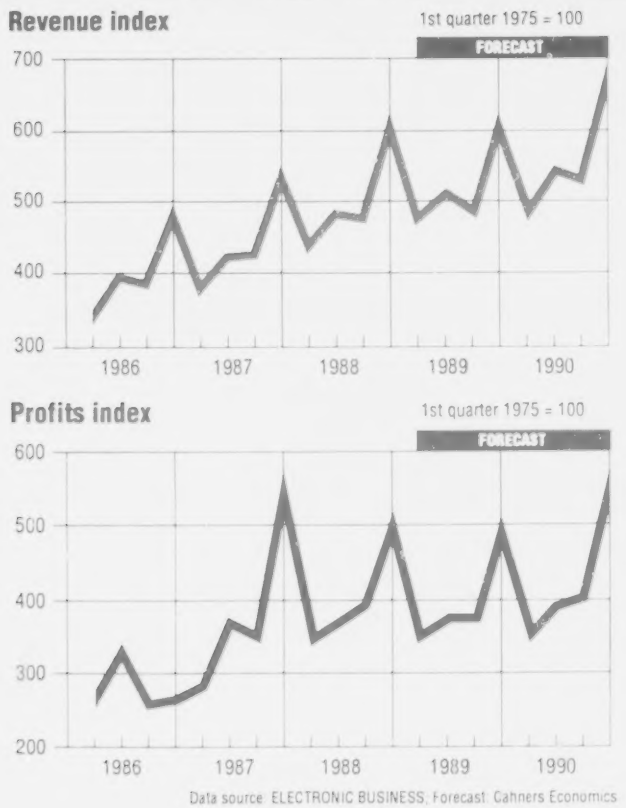
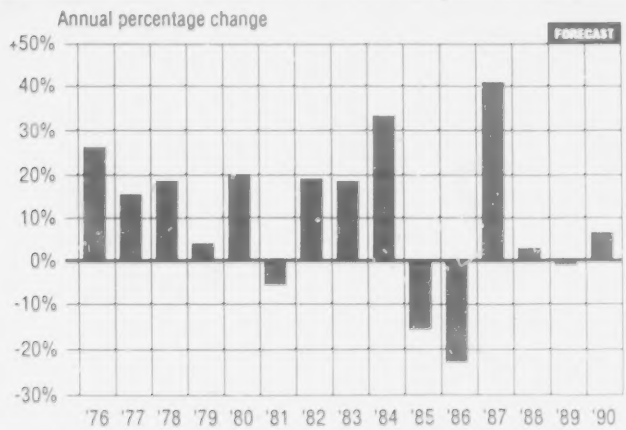


Data source: ELECTRONIC BUSINESS; Forecast: Cahners Economics

Electronics long-term profit performance



Data source: ELECTRONIC BUSINESS; Forecast: Cahners Economics

Lackluster profits set stage for cost cuts

Profits at electronics companies continued to grow in the first quarter of 1989, although growth was limited to 0.4% above year-ago levels. After a 10% year-ago decline in profits during the final quarter of 1988, the stable profit picture in early 1989 is reassuring news. The outlook for profits later this year: Expect profits to drop below year-ago levels in the last half of 1989, followed by slow and steady gains in 1990.

Profit gains over year-ago levels were shared across the board among ten of the sixteen companies ELECTRONIC BUSINESS includes in the industry index. In the semiconductor industry, Advanced Micro Device's profits weakened, while Intel Corp. and Motorola Inc. profits experienced gains. Likewise, in the computer industry, Digital Equipment Corp.'s profits slipped while IBM's profits rose.

After mixed profit performance in early 1989, all companies will be struggling to maintain profit growth later this year. One reason will be much slower revenue gains. Revenue growth, which peaked at a year-ago rate of 14.9% in early 1988, had inched down to a 9.2% growth rate by early 1989. Favorable operating conditions last year are giving way to less favorable conditions now. End-market growth is slowing, business investment growth has passed its peak, and inflation is picking up steam.

Limited cutting options

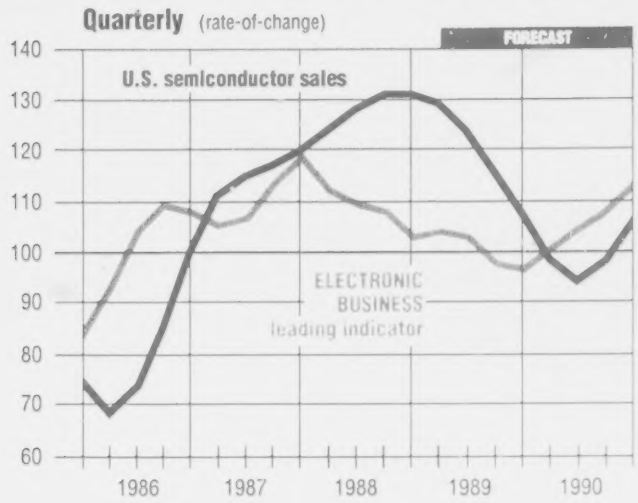
How many cost-cutting options do electronics companies have? Inventories, which have traditionally been an unpredictable and often high cost, have been kept low. Labor, which has never been a large share of costs, will not have much impact in the cost-cutting equation. Cutting R&D, which already suffered significant declines during the last recession, may be an option once more. Whatever the final decisions, the options are limited. So despite Wall Street's pressure to increase short-term profits, 1989 will most likely be a lackluster year for the bottom line.

Keep 1989 in perspective: Electronic company profits tumbled 17% in 1985 and 23% in 1986. The next two years are more likely to see profits dip 1.3% in 1989 and rise 7% in 1990, thanks to the recession-free slowdown in electronics industry revenue.

ELIZABETH B. BAATZ

ELECTRONIC BUSINESS profit and revenue index will appear again in the October 2 issue.

ELECTRONIC BUSINESS leading indicator



The ELECTRONIC BUSINESS leading indicator predicts turning points in U.S. semiconductor sales with about a three- to nine-month leadtime. For more information please contact Elizabeth Baatz, senior economist, Cahners Publishing Co., 275 Washington St., Newton, Mass., 02158, or call (617) 558-4368.

The ELECTRONIC BUSINESS leading indicator jumped to 105.0 in March, up from 102.8 in February. These early months of 1989 have shown some jerky upward motion, signaling a more stable environment for semiconductors and electronics in 1989 and 1990 than previously thought.

Source: Cahners Economics

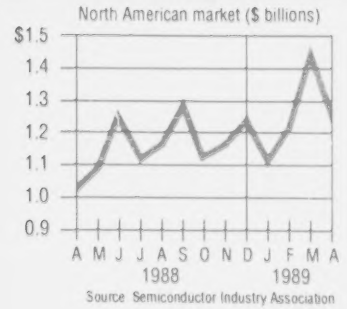
Electronics industry indicators this month

	Latest month	Previous month	Year ago	1988 average
ELECTRONIC BUSINESS leading indicator (rate-of-change, March)	105.0	102.8	110.9	107.6
U.S. semiconductor bookings ($ millions, 3-month average, April)	$1,358	$1,345	$1,223	$1,178
Weekly hours of semiconductor production workers (monthly average, March)	39.5	39.3	40.2	40.2
Electronic components leadtime index (1977 = 100, May)	110.6	117.7	114.9	108.9
S&P's semiconductor stock price index (1970 =10, monthly average, April)	51.3	47.4	60.1	54.4
Change in electronic components inventories ($ millions, SA, March)	+$43	+$95	+$29	+$80
Contracts and orders for plant and equipment ($ billions, SA, March)	$42.6	$41.3	$36.4	$39.4

SA = seasonally adjusted, all other data is not seasonally adjusted

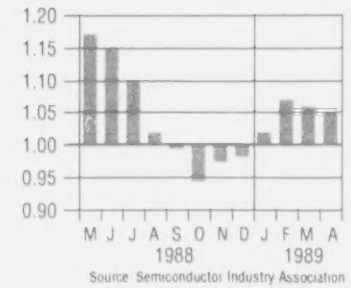
Sources: Semiconductor Industry Association, U.S. Bureau of Labor Statistics, *Electronics Purchasing* magazine, Standard & Poor's, U.S. Commerce Department, U.S. Bureau of Economic Analysis

Semiconductor sales



Source: Semiconductor Industry Association

Semiconductor book-to-bill ratio



Source: Semiconductor Industry Association

Component inventory-to-shipments

Source: U.S. Commerce Department